

100

100

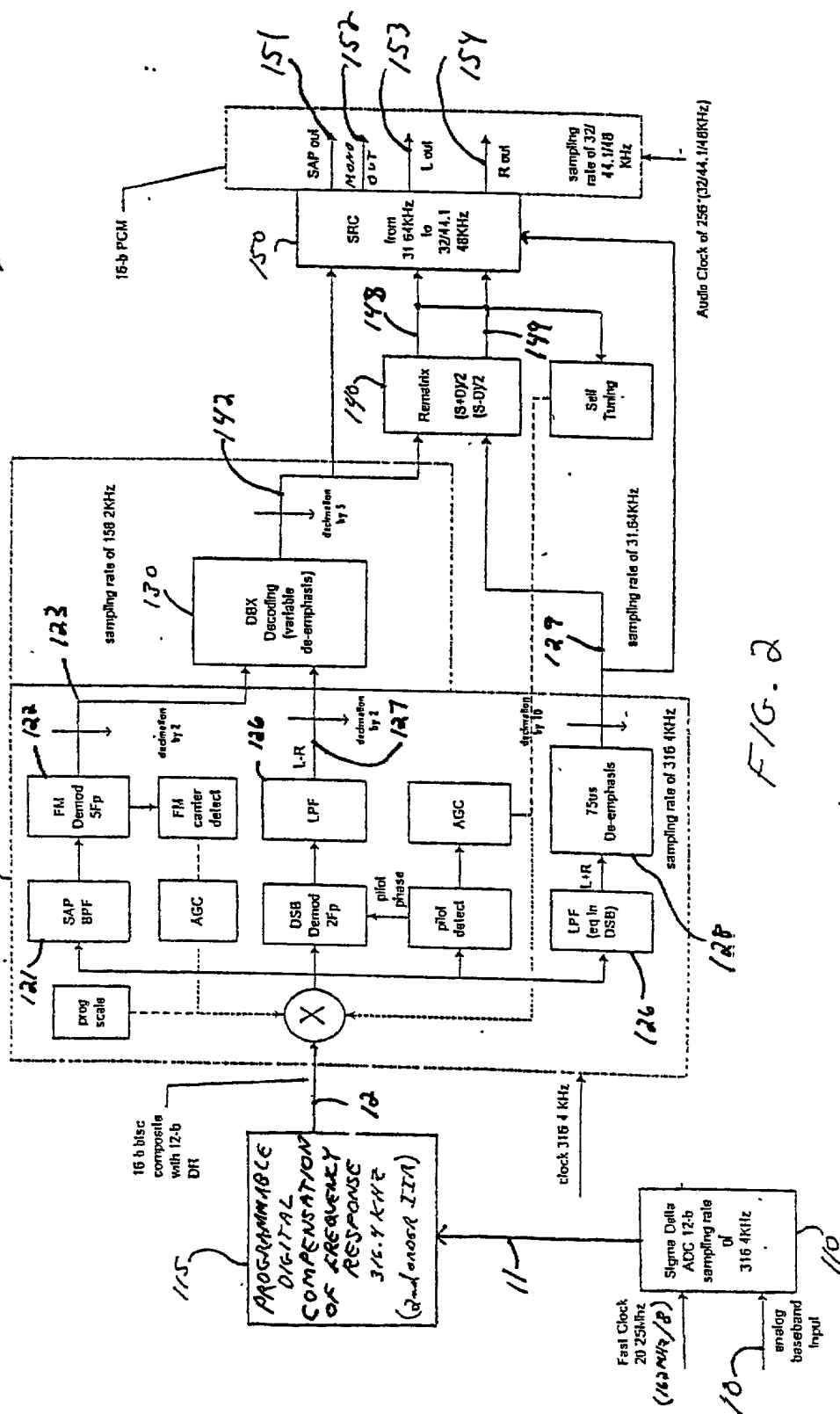


FIG. 2

FIG. 2B

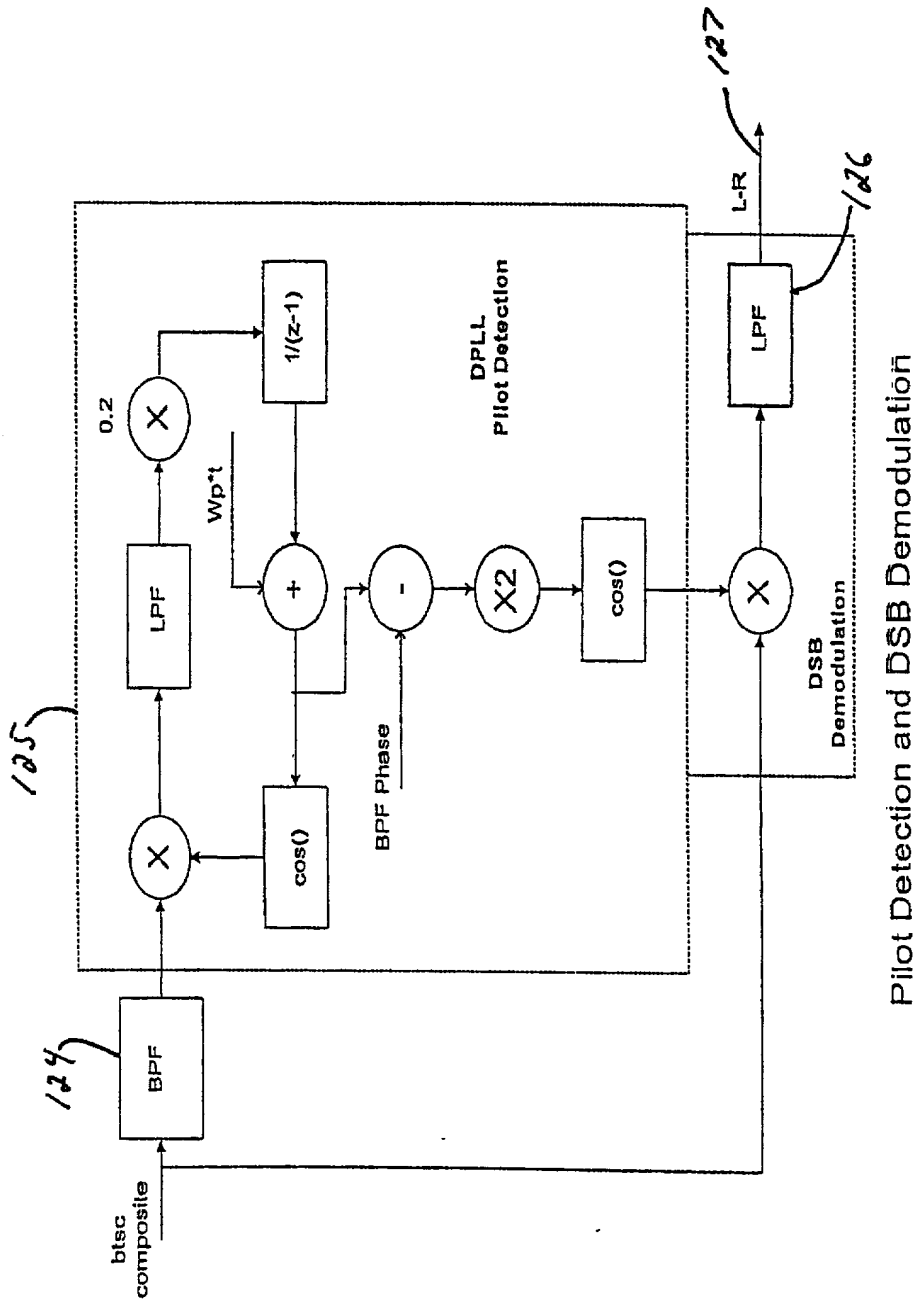
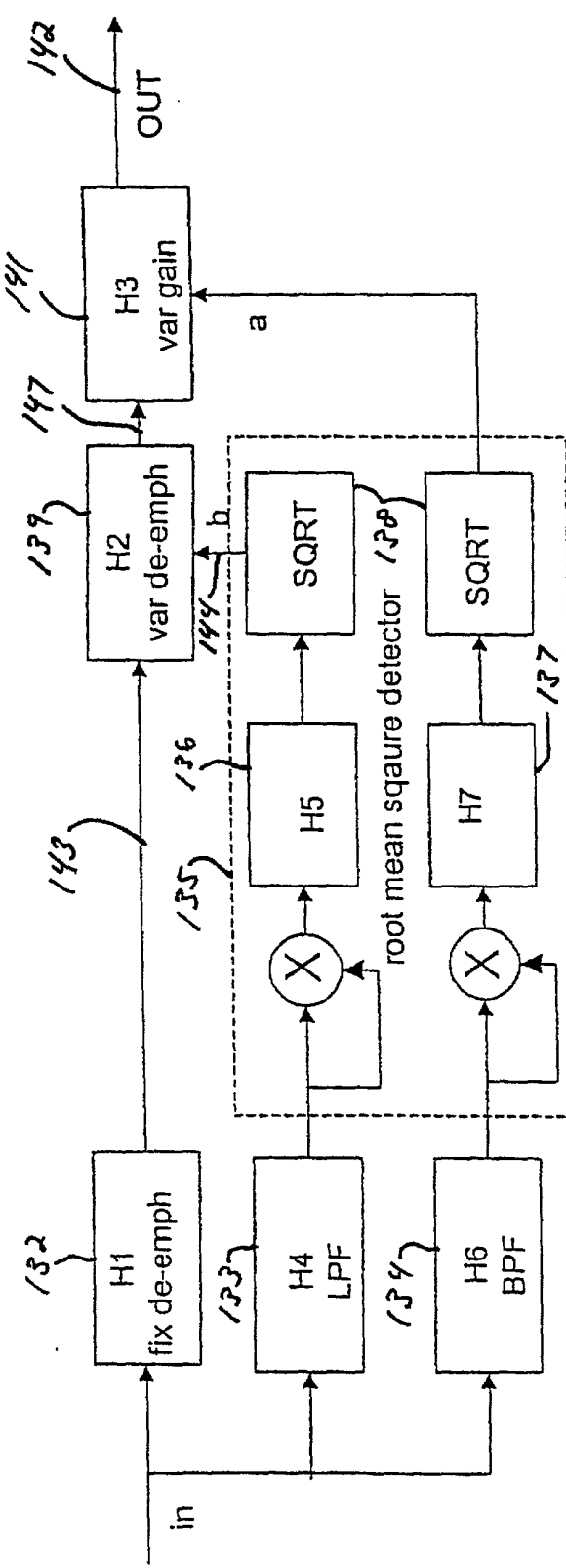


FIG. 3

131



DBX Decoding Transfer Function

FIG. 3B

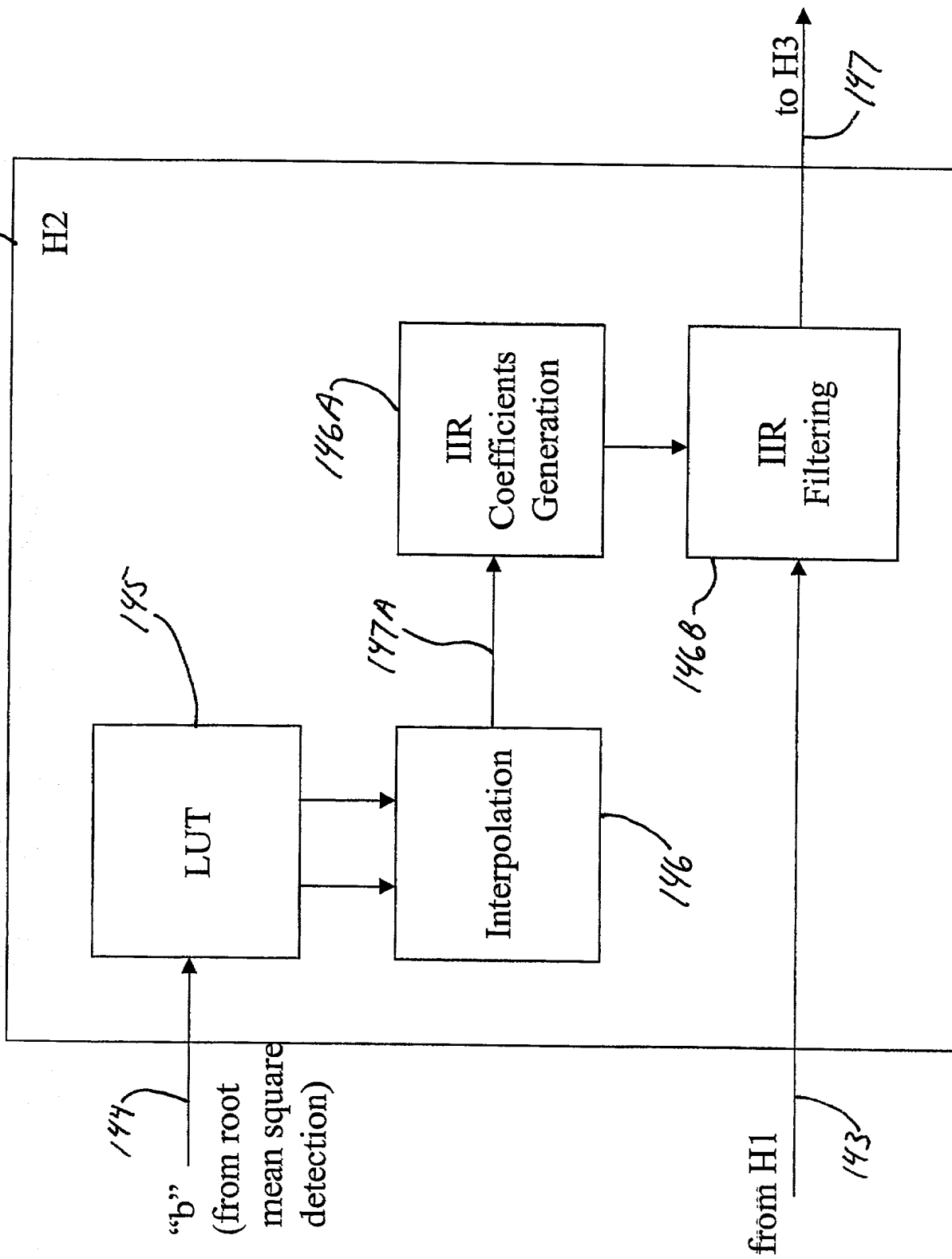


FIG. 4

160

$$H1(s) = \frac{\frac{s}{23 \times 2\pi} + 1}{\frac{s}{0.408 \times 2\pi} + 1} \times \frac{\frac{s}{62 \times 2\pi} + 1}{\frac{s}{2.19 \times 2\pi} + 1}$$

$$H2(s) = \frac{1 + \left(\frac{s}{20 \times 2\pi} \right) \left(\frac{b + 51}{b + 1} \right)}{1 + \left(\frac{s}{20 \times 2\pi} \right) \left(\frac{1 + 51}{b + 1} \right)}$$

$$H3(s) = a$$

$$H4(s) = \frac{\left(\frac{2}{7.66 \times 2\pi} \right)^2}{\left[\left(\frac{s}{7.66 \times 2\pi} \right)^2 + \left(\frac{s}{7.31 \times 2\pi} \right) + 1 \right]} \times \frac{1}{\left[\left(\frac{s}{26.9 \times 2\pi} \right) + 1 \right]} \times \frac{\left(\frac{s}{3.92 \times 2\pi} \right)}{\left[\left(\frac{s}{3.92 \times 2\pi} \right) + 1 \right]}$$

$$H5(s) = \frac{a2}{s + a2}$$

$$H6(s) = \frac{\left(\frac{s}{0.0354 \times 2\pi} \right)}{\left(\frac{s}{0.0354 \times 2\pi} + 1 \right) \left(\frac{s}{2.09 \times 2\pi} + 1 \right)}$$

$$H7(s) = \frac{a1}{s + a1}$$

165

$$H1(z) = \frac{(0.0857 - 0.0696z^{-1})(0.0909 - 0.0076z^{-1})}{(1.0 - 0.9839z^{-1})(1.0 - 0.9167z^{-1})}$$

165A →
$$H2(z) = \frac{(103 \cdot b + 3) - z^{-1}(101 \cdot b + 1)}{(3 \cdot b + 103) - z^{-1}(b + 101)}$$

$$H3(z) = a$$

$$H4(z) = \frac{0.5715 \cdot 0.45085 \cdot (1 - z^{-1})^3}{(1.0 - 2.0 \cdot 0.5997 z^{-1} + 2.0 \cdot 0.1470 z^{-2})(1.0 - 2.0 \cdot 0.8242 z^{-1} + 2.0 \cdot 0.3635 z^{-2})}$$

$$H5(z) = \frac{0.047^2}{1 - 0.99945 z^{-1}}$$

$$H6(z) = \frac{0.07959 (1 - z^{-2})}{1 - 2.0 \cdot 0.9595 z^{-1} + 2.0 \cdot 0.4595 z^{-2}}$$

$$H7(z) = \frac{0.02699^2}{1 - 0.9998 z^{-1}}$$

The square root calculation is done through the following equation

$$y[0] = 0.66667 \cdot sq_in + 0.354167$$

$$sqrt = coef12 \cdot (sq_in - y[0] \cdot y[0]) + y[0]$$

THE value of sq_in is between 1.0 to 0.25, and coef12 is one of 12 coefficients chosen based on sq_in.

FIG. 5

200

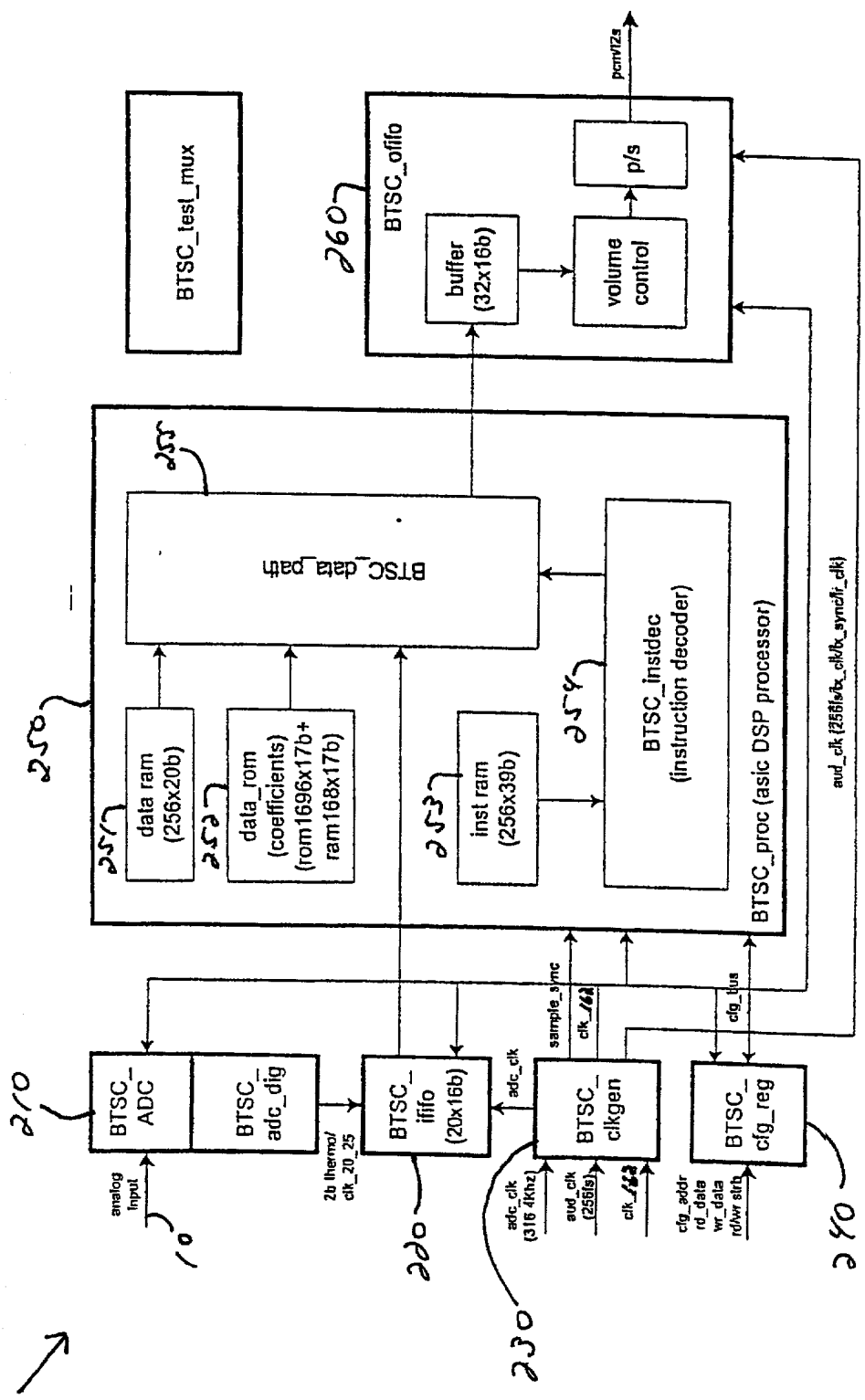
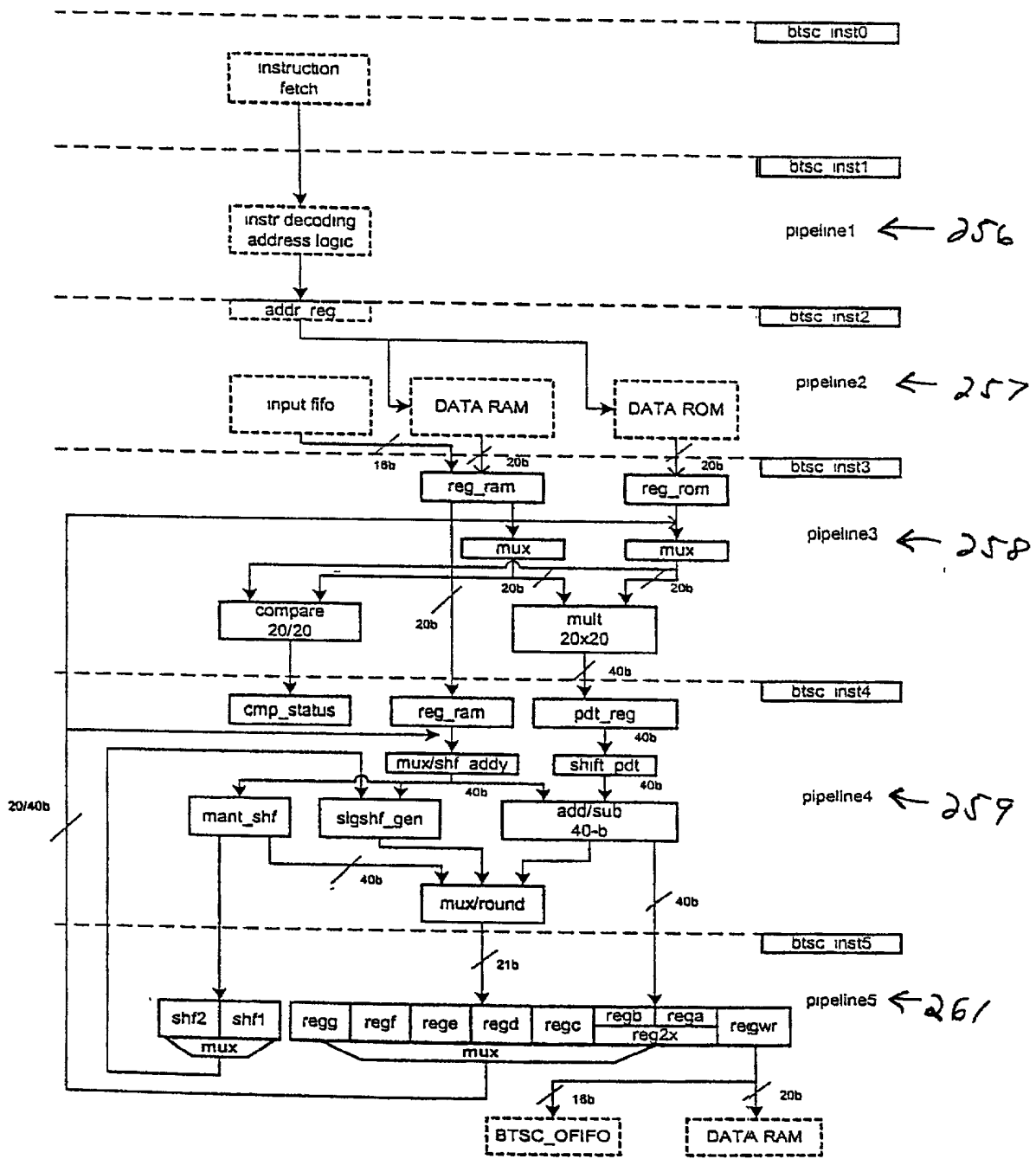


FIG. 6



Data Path of the Processor

300



F/G. 7

code	instruction	cycles	description
0	nop	1	no operation
1	mant	1	mantissa and exponent generation from 40-b register
2	sigshf	1	convert from mantissa and exponent to fixed-point signal
3	mults	1	multiplication and subtraction
4	multa	1	multiplication and add
5	fos	3	micro code do 20-b 1st order IIR filter which is made of 3 mults/multa
6	sos	5	micro code does 20-b 2 nd order IIR filter which is consisted of 5 mults/mults
7	rms	6	micro code does 20b square and 40-b 1 st order IIR filter, which is consisted of 6 mults/multa
8	halt	1	halt program
9	setli	1	setup inner loop
10	setlo	1	setup outer loop
11	jmpif	1	conditional jump
12	call	1	call routine
13	cmp	1	compare two register value and store 1-b result in status register
14	fos2	6	micro code does 40-b 1s order IIR filter which is consisted of 6 mults/multa
15	dload	1	directly store coded data to register or ram location

301

302